

070337.0234

Claims

1	A rubber composition usable for the manufacture of tires, comprising, as base
2	constituents, a diene elastomer, a white filler as reinforcing filler and a coupling agent
3	(white filler/elastomer) that links the reinforcing filler and the elastomer, the white filler
4	comprising a titanium oxide having the following characteristics:

- (a) it comprises by mass more than 0.5% of a metallic element, other than titanium, selected from the group consisting of Al. Fe, Si, Zr and mixtures thereof;
- (b) its specific BET surface area is between 20 and 200 m²/g;
- (c) its average particle size (by mass), dw, is between 20 and 400 nm; and
- (d) its disagglomeration rate, α , measured by the ultrasound disagglomeration test, at 100% power of a 600-watt ultrasonic probe, is greater than $2x10^{-2} \mu m^{-1}/s$..
- 2. The composition according to Claim 1, wherein the total quantity of reinforcing filler is between 20 and 400 phr (parts by weight to one hundred parts of elastomer).
- 3. The composition according to Claim 1, wherein the BET surface area of the titanium oxide is within a range of 30 to 150 m²/g.
- 4. The composition according to Claim 1, wherein the average particle size d_w of the itanium oxide is within a range of 30 to 200 nm.
- 5. The composition according to Claim 1, wherein the disagglomeration rate α of the titanium oxide is greater than $5x10^{-2} \mu m^{-1}/s$.



5

6

7

8

9

10

1

2

3



1 6. The composition according to Claim 1, wherein the reinforcing white

- 2 filler comprises more than 50% by weight titanium oxide.
- 7. The composition according to Claim 1, wherein the total reinforcing white
- 2 filler is titanium oxide.
- 8. The composition according to Claim 1, wherein the reinforcing white
- 2 filler further comprises silica and/or alumina.
- 9. The composition according to Claim 1/2, further comprising one or more
- 2 carbon blacks as a reinforcing filler.
- 10. The composition according to any of Claims 1 and 9, wherein the quantity
- total of reinforcing filler is between 30/and 200 phr.
- 1 11. The composition according to Claim 1, wherein the quantity of coupling
- 2 agent is between 10⁻⁷ and 10⁻⁵ mole per square meter of reinforcing white filler.
- 12. The composition according to Claim 11, wherein the quantity of coupling
- agent is between $5x10^{-7}$ and $5x10^{-6}$ moles per square meter of reinforcing white filler.
- 1 13. The composition according to Claim 1, wherein the titanium oxide satisfies
- 2 one or both of the following characteristics:
- 3 its BE/T surface area is within the range of 70 to 140 m²/g;
- 4 its particle size d_w is within the range of 50 to 100 nm.
- 14. The composition according to Claim 1, wherein the titanium oxide
- 2 satisfies all the following characteristics:



070337.0234

titanium, selected from the group consisting of Al, Fe, Si, Zr and mixtures thereof; 4 5 - its BET surface area is within the range of 70 to 140 m²/g; - its particle size d_w is within the range of 50 to 100 nm; and 6 - its disagglomeration rate α is greater than 5×10^{-2} µm⁻¹/s.

15. The composition according to Claim 1, wherein the coupling agent is a 1 2 polysulphurized alkoxysilane.

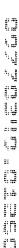
- it comprises by mass more than 1% of a metallic element other than

16. The composition according to Claim 1, wherein the diene elastomer is selected from the group consisting of polybytadienes, polyisoprenes, natural rubber, butadiene-styrene copolymers, butadiene-isoprene copolymers, butadieneacrylonitrile copolymers, isoprene-styrene copolymers, butadiene-styrene-isoprene copolymers, and mixtures thereof.

17. The composition according to Claim 16, wherein the diene elastomer is a butadiene-styrene copolymer/prepared in solution having a styrene content of between 20% and 30% by weight, a content of vinyl bonds of the butadiene part of between 15% and 65%, a content of trans-1,4 bonds of between 20% and 75% and a glass transition temperature of between -20°C and -55°C.

18. The composition according to Claim 17, further comprising a polybutadiene/having more than 90% cis-1,4 bonds.

19. The composition according to Claim 1, wherein the diene elastomer is an EPDM copolymer.



3

1

2

3

4

5

1

2

3

4

5

1

2

1

2



070337.0234

20. A reinforcing filler comprising a titanium oxide having the following 1 characteristics: 2 (a) it comprises more than 0.5% by mass of a metallic element other than 3 titanium, selected from the group consisting of Al, Fe, Si, Zr and mixtures thereof; 4 (b) its specific BET surface area is between 20 and 200 m²/g; 5 (c) its average particle size (by mass), dw/is between 20 and 400 nm; and 6 (d) its disagglomeration rate, α, measured by the ultrasound 7 disagglomeration test, at 100% power of a 600-watt ultrasonic probe, is greater than 8 2x10⁻² μm⁻¹/s, wherein the filler reinforces a diene rubber composition usable for 9 10 manufacturing tires. 21. A process for reinforcing a diene rubber composition usable for the 1 manufacture of tires, comprising incorporating by mechanical kneading into the 2 diene rubber composition in an uncured state a titanium oxide having the following 3 4 characteristics: (a) it comprises more than 0.5% by mass of a metallic element, other than 5 titanium, selected from the group consisting of Al, Fe, Si, Zr and mixtures thereof; 6 (b) its specific BET surface area is between 20 and 200 m²/g; 7 (c) its/average particle size (by mass), d_w, is between 20 and 400 nm; and 8 9 (d)/ts disagglomeration rate, α, measured by the ultrasound disagglomeration test, at 100% power of a 600-watt ultrasonic probe, is greater than 10 $2x10^{-2} \mu m^{-1}/s$. 11





070337.0234

- 22. A rubber article comprising a composition according to Claim 1.
- 23. A tire comprising a rubber composition according to Claim 1.
- 24. A colored tire comprising a rubber composition according to Claim 1.
- 25. A tread for a tire comprising a rubber composition according to Claim 1.
 - 26. A colored tread for a tire comprising a rubber composition according to
- 2 Claim 1

1

1

1

1